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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/295,607	04/22/1999	SHUNPEI YAMAZAKI	0756-1961	7371

7590

07/15/2003

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EXAMINER

LOKE, STEVEN HO YIN

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 07/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/295,607

Applicant(s)

YAMAZAKI ET AL.

Examiner

Steven Loke

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,3,6-8,11,12,15-17,19-35 and 37-67 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2,3,6-8,11,12,15-17,19-21,23-27,29-35, 37-39,41-50 and 52-59 is/are allowed.
- 6) ☒ Claim(s) 60-67 is/are rejected.
- 7) ☒ Claim(s) 22,28,40 and 51 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 45.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 60-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Troxell et al. in view of Ikeda (Japanese patent no. 59-121876 in PTO-1449), further in view of Shimada et al.

In regards to claims 60 and 61, Troxell et al. discloses a semiconductor device in fig.

1. It comprises: a polycrystalline silicon thin film transistor formed on a glass substrate [10]; a silicon nitride layer [14] and silicon dioxide layer [16] formed on the top surface of the glass substrate [10] and a silicon nitride layer [12] formed on the bottom surface of the glass substrate [10].

Troxell et al. differs from the claimed invention by not showing an AlN layer formed on the rear surface and the top surface of the substrate.

Ikeda shows an AlN layer [12] formed on the rear surface and the top surface of a glass substrate [11] in fig. 1(c).

Since both Troxell et al. and Ikeda teach an insulating layer formed on a glass substrate, it would have been obvious to have the AlN layer of Ikeda formed on the rear surface and the top surface of the glass substrate of Troxell et al. because they prevent a thin film device from deforming at the time of forming the device. The combined device shows a composite insulating film comprising AlN and oxygen provided over the front surface of the glass substrate.

Troxell et al. further differs from the claimed invention by not showing a pixel electrode over the leveled interlayer insulating film.

Shimada et al. discloses a semiconductor device in figs. 1-3. It comprises: a polycrystalline silicon thin film transistor formed on a glass substrate [11]; the thin film transistor having a channel formation region comprising crystalline silicon, a gate insulating film [13] adjacent to the channel formation region, and a gate electrode [3a] adjacent to the channel formation region with the gate insulating film interposed therebetween; an interlayer insulating film [17] having a leveled upper surface over the transistor; a pixel electrode [4] over the interlayer insulating film [17].

Since both Troxell et al. and Shimada et al. teach an insulated gate field effect transistor serves as pixel control switch in the liquid crystal display, it would also have been obvious to have the interlayer insulating film and the pixel electrode of Shimada et al. in Troxell et al. because the interlayer insulating film can protect the transistor and the pixel electrode can provide an image from the transistor.

In regards to claims 62, 63, the combined device discloses a glass substrate.

In regards to claims 66, 67, the combined device shows the insulating AlN layer has an aluminum to nitrogen ratio of 1.0.

In regards to claims 64, 65, it is well known in the semiconductor art that aluminum nitride has a thermal conductivity of 0.6 W/cm K or higher.

3. Claim 22 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 2. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is

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proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

4. Claim 28 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 11. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

5. Claim 40 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 31. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

6. Claim 51 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 43. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

7. Applicant's arguments filed 4/14/03 have been fully considered but they are not persuasive.

It is urged, in page 5 of the remarks, that the proposed combination of Troxell et al. and Ikeda discloses a laminated layer of aluminum nitride and silicon nitride, but an insulating film comprising aluminum nitride and oxygen is never disclosed. However,

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the combined device discloses a laminated layer of aluminum nitride and silicon dioxide (layer [16] of Troxell et al.). Since the silicon dioxide layer comprising oxygen, the combined device shows a laminated layer of aluminum nitride and oxygen. It is believed that the combined device discloses all of the claimed limitation.

8. Claims 2, 3, 6-8, 11, 12, 15-17, 19-21, 23-27, 29-35, 37-39, 41-50 and 52-59 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter: The first major difference in the claims not found in the prior art of record is an aluminum nitride insulating film containing therein oxygen provided under the rear surface of the substrate. The second major difference in the claims not found in the prior art of record is an aluminum nitride insulating film containing therein carbon provided under the rear surface of the substrate. The third major difference in the claims not found in the prior art of record is an insulating film comprising aluminum nitride and oxygen provided under the rear surface of the substrate. The fourth major difference in the claims not found in the prior art of record is an insulating film comprising aluminum nitride and carbon provided over the front surface of the substrate. The fifth major difference in the claims not found in the prior art of record is an aluminum nitride insulating film containing therein carbon provided over the front surface of the substrate.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sl
July 11, 2003

Steven Loke
Primary Examiner
Steven Loke